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Hygiene, health and sanitation awareness as part of developing and validating a physical education toolkit: contributing to personal and social well-being of children from Port Elizabeth, South Africa

Masterarbeit

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Table of contents

List of figures

List of tables

Abstract

Background

Physical inactivity and a sedentary lifestyle are key risk factors for chronic non-communicable diseases, while poor hygiene behaviour is at the root of many communicable diseases such as infections with soil-transmitted helminths. This double burden also affects school-aged children growing up in disadvantaged areas. Within the *KaziBantu* project – 'Healthy Schools for Healthy Communities', an educational toolkit for primary schools (Grade 1-7) including physical education, moving-to-music lessons, and nutrition, health and hygiene education has been developed.

Methods

The mission was about the development of age-specific *Health and Hygiene Education* lessons as part of the *Nutrition, Health and Hygiene Education* toolkit. To identify health- and hygiene-related key messages, an intensive literature review, direct observations and school-based discussions with teachers, school management and local experts were conducted. Certain lessons have been piloted in two primary schools in impoverished areas of Port Elizabeth, South Africa.

Results

The *KaziKidz* toolkit follows the national curriculum and consists of lessons with corresponding worksheets, posters, games and assessments. Interactive lessons including activities in and outside the classroom, theoretical instructions as well as practical training support teachers in teaching their learners important life skills and good hygiene behaviour. The piloted lessons were well-accepted by teachers and students.

Conclusions

A school-based toolkit was developed with the aim of having a positive impact on school children's health through improved hygiene awareness and resulting behaviour change. Learners, teachers and the school management are facing challenging conditions and existing barriers. Therefore, supporting each other is indispensable in order to improve the children's health.

Zusammenfassung

Hintergrund

Körperliche Inaktivität und ein sedentärer Lebensstil sind wichtige Risikofaktoren für chronische Krankheiten, während ungenügende Hygiene viele übertragbare Krankheiten wie parasitäre Wurminfektionen begünstigt. Diese Doppelbelastung betrifft auch schulpflichtige Kinder in unterprivilegierten Gegenden. Im Rahmen des *KaziBantu*-Projekts "Healthy Schools for Healthy Communities" wurde ein Lehrmittel für Primarschulen (Stufe 1-7) entwickelt, welches Sport- und Tanzunterricht, Ernährungs-, Gesundheits- und Hygieneaufklärung umfasst.

Methoden

Die Aufgabe bestand in der Entwicklung von altersgerechten Gesundheits- und Hygienelektionen als Teil des *Nutrition, Health and Hygiene Education* Lehrmittels. Um gesundheits- und hygienerelevante Kernbotschaften zu identifizieren wurden eine intensive Literaturrecherche, direkte Beobachtungen und Gespräche mit Lehrern, Vertretern der Schulleitung und lokalen Experten durchgeführt. An zwei Grundschulen in benachteiligten Stadtteilen von Port Elizabeth in Südafrika wurden entwickelte Lektionen getestet.

Resultate

Das *KaziKidz* Lehrmittel ist in das nationale Curriculum angepasst und besteht aus Lektionen mit entsprechenden Arbeitsblättern, Postern, Spielen und Prüfungen. Interaktiver Unterricht mit Aktivitäten in- und außerhalb des Klassenzimmers, theoretischer Unterricht sowie praktisches Training unterstützen die Lehrer dabei, ihren Schülern wichtige Lebensfertigkeiten und gutes Hygieneverhalten beizubringen. Pilotversuche wurden erfolgreich durchgeführt und von Lehrern und Schülern positiv aufgenommen.

Schlussfolgerungen

Ein Lehrmittel für Gesundheits- und Hygieneunterricht wurde entwickelt, welches sich durch verbessertes Hygienebewusstsein und daraus resultierende Verhaltensänderungen positiv auf die Gesundheit der Schulkinder auswirken soll. Um dieses Ziel zu erreichen, müssen herausfordernde Bedingungen und Hindernisse überwunden werden. Daher ist es unerlässlich, dass Lernende, Lehrer und die Schulleitung sich gegenseitig unterstützen, die Gesundheit der Schulkinder zu verbessern.

List of abbreviations

BMI	Body mass index
CAPS	Curriculum and Assessment Policy Statement
DASH	Disease, Activity and School children's Health
NCD	Non-communicable disease
NMU	Nelson Mandela University
STH	Soil-transmitted helminthiasis
UNICEF	United Nations Children's Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

1. Introduction

"It all starts with me. The change that I want to see from my school, from my environment, from my community, it has to start with me. Because I have learnt to be a confident life skill learner. And therefore, if I am confident, I will be able to say: 'This is done this way.' So I take responsibility."

- The Deputy's wish for her learners

Enkwenkwezini Public Primary School,

Port Elizabeth, South Africa.

(T. P. Mali, personal communication, November 3, 2017)

It all started in 2014 when the *Disease, Activity and School children's Health* study (*DASH*) conducted various surveys and interventions among approximately 1'000 primary school children in socioeconomically disadvantaged neighbourhoods of Port Elizabeth, Eastern Cape Province, in South Africa (Yap et al., 2015). South Africa is the southernmost country in Sub-Saharan Africa and well known for its multiculturalism, diversity and multilingualism. Eleven major languages are spoken and South Africa is still known as the rainbow nation. A nation, which lives in peace with itself and the world. The post-apartheid South Africa has changed a lot of what the country has been before 1994. But the past is still an inescapable shadow which follows anybody of those days (Morris, 2012). According to the South African Human Rights Commission & the United Nations Children's Fund (UNICEF) (2011), South Africa is still one of the most unequal countries in the world. Just 1.8% of the total national household income is earned by the poorest 20% of the total population. Port Elizabeth, where the project took place, is situated in the Eastern Cape Province, where the number and percentage of children living in poverty reaches one of the highest rates among all provinces (Kibel, Lake, Pendlebury, & Smith, 2010).

The harsh realities of life in shantytowns can also be seen in school life and that is why the *DASH* project tried to make a difference. Disease status, anthropometry, level of physical fitness, cognitive performance and psychosocial health have been assessed and compared. Additionally, the school children were screened if they were infected with parasitic worms and got treated if it was necessary.

It has been reported that physical activity levels are insufficient in primary schools in impoverished areas in South Africa due to a lack of qualified teachers and inadequate sport facilities (Walter, 2011). Physical inactivity is often associated with other unhealthy lifestyle traits like bad nutritional habits. These factors can promote the development of non-communicable diseases (NCDs) like diabetes, cardiovascular diseases or cancer (Marshall, 2004). Unfortunately, this burden is not the only one these communities are facing. Communicable diseases like infections with soil-transmitted helminths (STHs) build up a

double burden which already affects primary school children. As mentioned by UNICEF (n.d.), healthy children become healthy adults who create better lives for themselves, their community and their country. Therefore, it is crucial to improve the health of children as a contribution to the fight against poverty.

That is the reason why the follow-up project of the *DASH* study was launched in summer 2017. '*KaziBantu* – Healthy Schools for Healthy Communities' builds on school-based health interventions, which improve the health of school children and teachers in low socioeconomic areas. This is reflected in the name: *Kazi* means 'active' in Swahili and *Bantu* stands for 'people' in Xhosa, two of the national languages of South Africa. The school-based interventions include physical activity promotion in different forms and health education, focused on nutrition, health and hygiene topics. The current project is led by the Department of Sport, Exercise and Health Science of the University of Basel, Switzerland and the Department of Human Movement Science of the Nelson Mandela University (NMU) in Port Elizabeth, South Africa. The project is supported by the Swiss Tropical and Public Health Institute and in strong collaboration with local experts.

2. Background

This chapter describes the topic-related background about some important factors which can have an influence on school children's health.

2.1 Water, Sanitation and Hygiene (WASH) in schools

2.1.1 WASH – Water, Sanitation and Hygiene

According to the estimates of the World Health Organisation (WHO) & UNICEF (2017), 2.3 billion people worldwide still lack improved sanitation service and 844 million do not have a safe drinking water service. In South Africa, more than 25 per cent of the population do not have access to basic sanitation and 15 per cent only have limited and unimproved access to drinking water. As UNICEF (2016) indicates, fulfilling every child's right to clean water for drinking and washing, and improved sanitary facilities is a great challenge. Furthermore, every child should receive hygiene education and a healthy school environment. To provide basic health services, adequate water, sanitation and hygiene (WASH) are essential components. These include water sources or supplies in the facility or near to it, and sufficient water for drinking and appropriate hygiene practises. (UNICEF, 2016).

2.1.2 Hygiene education as part of school-based WASH interventions

Despite the fact that schools increasingly recognized that adequate water and sanitation facilities are an essential factor in promoting school children's health and therefore also their learning performance, many school in South Africa still have poor facilities. Water, sanitation and hygiene have a great influence on the daily lives of school children. According to UNICEF (2003), factors which are related to WASH affect the children's education in many ways. Unhealthy children are not able to realize their full potential in school and are left behind. Increased absenteeism and high drop-out rates are additional negative effects. As a result, a crucial component of WASH improvement programs in schools is the hygiene education.

Access to safe water and improved sanitation facilities and adequate hygiene practices enhances the well-being and health of school children and thus effective hygiene education can have a great impact on the growth of children. The newly acquired health and hygiene behaviour can lead to life-long positive habits because at that age, children are often willing to learn and are able to quickly absorb new skills. Furthermore, their behaviour can influence their family members, peer groups and the whole community (UNICEF, 2012).

2.2 Soil-transmitted helminths (STHs)

Soil-transmitted helminth infections are caused by different intestinal worms. The main parasitic worms are *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm) and hookworms (*Anclostoma duodenale* and *Necator americanus*) (Bethony et al., 2006). People can be infected with more than one species at the same time and the parasites can occur

simultaneously in the same area (World Health Organization, 2010). Globally, soil-transmitted helminth infections are the most wide-spread and common of the neglected tropical diseases. According to WHO (2017), approximately 1.5 billion people worldwide are infected with soil-transmitted helminths. More than 568 million school-age children live in conditions and areas where these infections are intensively transmitted (World Health Organization, 2017). Children are more infected with parasitic worms than any other age group, except hookworms which are equally common in adults, and have relatively high prevalence and infection intensities mainly because of their preference for outdoor activities, poor knowledge about hygiene practises, and barefoot walking (Taiwo, Sam-Wobo, Idowu, Talabi, & Taiwo, 2017).

The transmission of soil-transmitted helminths is caused by eggs which are passed in the faeces of infected people, except hookworm infections which are caused by the larvae. The passed eggs need about three weeks to mature in the soil, therefore there is no direct person-to-person transmission or infections through fresh faeces. The parasitic worms live in the gastrointestinal tract where they produce thousands of eggs each day. In areas, where there is a lack of sanitation and poor hygiene awareness, the eggs in the faeces contaminate the soil (World Health Organization, 2017). Due to the fact, that 892 million people worldwide still practise open defecation, it is hardly surprising that the number of infections is that high (World Health Organization & UNICEF, 2017). The transmission of parasitic worms happens when eggs are ingested from contaminated water sources or when attached to vegetables and the vegetables not have carefully been washed, peeled or cooked. Furthermore, when children are playing outside on contaminated soil and then put their hands in their mouth without washing them before. Hookworm larvae can actively penetrate the skin when walking barefoot on contaminated soil (World Health Organization, 2017). The infection risk of STHs is closely linked to the environment and its contamination, as well as behaviour. Thus, the transmission of STHs is associated with poverty, poor hygiene, inadequate sanitation and waste disposal, lack of clean water and is common in impoverished urban areas (Bethony et al., 2006).

Morbidity is related to the number of worms in the gastrointestinal tract. The higher the number of worms, the greater the severity of disease. Light intensity infections usually do not cause morbidity, but heavy intensity infections will cause different symptoms which negatively impact the individual's health (World Health Organization, 2017).

2.3 Current situation in South Africa

South Africa is one of the most unequal countries in the world. The post-apartheid time has changed the higher middle-income country, but it is still battling with its after-effects and consequences (Morris, 2012). The gap between rich and poor is wide. Wealth is unequally distributed. Impoverished and low socio-economic areas, where during apartheid people were forcefully moved, depending on their skin colour, are called townships or township areas. Still today, in these townships are living mainly Black or Coloured people under harsh circumstances including high criminality and unemployment rates, lack of sanitation facilities and insufficient education institutions. These factors are also reflected in the education system.

2.3.1 Education system

Salisbury (2016) showed that there are differences by race in the number of school years completed. Black and Coloured people attend on average 8.8 and 8.4 years of school, while White people attend 13.2 years. According to an analysis from Spaull (2013) about the South African education system, there are still two different systems in the country. One is wealthy, functional and able to educate students, while the other one is poor, dysfunctional and not able to equip students with enough necessary skills. The first serves predominantly White students and the second serves mostly the Black students. The gap between the poorest and the wealthiest is wide. By Grade 9, the difference between the poorest 60 per cent and the wealthiest 20 per cent can grow up to four Grade-levels. The low-quality of education for the poorest traps them in poverty. The poor children, who represent the majority of South Africa's children, are staying behind. The education system is not able to teach the children enough skills, knowledge and values to become full members of the society (Spaull & Kotze, 2015).

2.3.2 Situation in disadvantaged primary schools in Port Elizabeth, Eastern Cape

In comparison to other provinces, the majority of all schools with no sanitation facilities and one third of all schools without electricity and water supply are located in the Eastern Cape (Department of Basic Education, 2016b). Equal Education (2016), a movement of teachers, learners and parents for quality and equality in schools, mention in their report that learners face bad conditions in many schools in the Eastern Cape Province. According to the Education Series II (Statistics South Africa, 2016), more than 10 per cent of schools in Port Elizabeth lack access to toilets, electricity and piped water. Some school have acceptable sanitation facilities but functionality is insufficient (Figure 1 & 2) including non-working toilets or hand washing facilities, lack of equipment (e.g. soap) and substandard cleanliness. As reported by Equal Education (2016), in Eastern Cape's primary schools the ratios for working toilets:learners is up to 1:294. In these conditions, germs, worms and bacteria can easily be transmitted and risk of infections increases.

Figure 1. Toilet in a primary school in Port Elizabeth, South Africa. October 13, 2017.

Besides that, the waste management is poor. Littering seems to be a huge problem in some schools, but receives little attention from the school management. Waste bins are rare, and after the waste has been collected, it is usually burnt behind the school building (Figure 3).

Figure 2. Hand washing facility in a primary school in Port Elizabeth, South Africa. October 13, 2017.

Figure 3. Waste dumping site in a primary school in Port Elizabeth, South Africa. October 13, 2017.

Port Elizabeth is one of the districts with the largest school sizes compared to others in the Eastern Cape Province (Eastern Cape Department of Education, 2014). Lack of qualified teachers results in class sizes from 40 up to 60 or more school children in underprivileged schools in disadvantaged areas. This makes it difficult for teachers to present their lessons given the limited space, and insufficient and overused equipment.

3. Current status of research

This chapter describes the current status of research with regard to the impact of soil-transmitted helminth infections on child health, the relevance of WASH for soil-transmitted helminth control, and the potential of health education with a focus on WASH and soil-transmitted helminth infections.

3.1 Influence of soil-transmitted helminth infections on children's health

Depending on the number of helminths in the gastrointestinal tract the worse are the symptoms. Parasitic worm infections cause abdominal pain, diarrhoea, weakness and malaise. Negative effects on the nutrition status of the infected person due to malabsorption are also described. Iron and protein loss through chronic intestinal blood loss can cause anaemia and loss of appetite resulting in a reduction of the nutritional intake will also negatively influence the physical fitness. Furthermore, symptoms can lead to impaired growth and physical development (World Health Organization, 2017). The *DASH* study showed that school children infected with soil-transmitted helminths had lower bodyweights and smaller body sizes, decreased values in body mass index (BMI) and were more often stunted compared to non-infected children. Additionally, infected children had a lower maximum oxygen uptake. It was concluded that intestinal parasite infections have a small, but significant, negative effect on physical fitness of children (Müller et al., 2016). Gall et al. (2017) also found that school children, infected with *Ascaris lumbricoides* or *Trichuris trichiura*, or both, had lower selective attention capacities and significantly lower academic achievement scores. Similar results were measured among Filipino, Brazilian and Chinese school children (Ezeamama et al., 2005; Jardim-Botelho et al., 2008; Liu et al., 2015).

Jia, Melville, Utzinger, King, & Zhou (2012) reported in their meta-analysis that STH reinfections occur rapidly after treatment with anthelmintic drugs. These findings suggest that preventive chemotherapy in combination with sanitation improvements and health education is warranted. The treatment with anthelmintic drugs is effective in morbidity control, but does not prevent reinfection. Due to this fact, it is necessary to add improvements in hygiene behaviour, which are achieved through health education to get a sustainable control about the problem (McManus et al., 2014).

The WHO recommends the following interventions to control and eliminate soil-transmitted helminths infections: Periodical deworming to eliminate parasitic worms, combined with health education to prevent re-infections and improvements in sanitation to reduce soil contamination with eggs (World Health Organization, 2017).

3.2 WASH and soil-transmitted helminth infections

Deworming with anthelminthic drugs is a powerful way for treating STH infections, but rapid reinfections are common (Jia et al., 2012). For long-term prevention of soil-transmitted helminth infections, improvements in water, sanitation and hygiene (WASH) are required

(Strunz et al., 2014). In the systematic review of Strunz et al. (2014), different WASH practices have been compared. The results show that lower odds of STH infections were associated with handwashing after defecation, as was the use or availability of soap. A decreased likelihood of infection was associated with access to sanitation, except hookworm infections, use of treated water and wearing shoes. The findings confirm that WASH practices and adequate access to water and sanitation facilities provide an effective strategy to control STH in addition to short-term deworming. It is assumed that such interventions would translate into a positive impact on children's mental and physical health, but relevant empirical data is scarce.

3.3 Impact of health and hygiene education on school children's health

Several studies on the impact of health and hygiene education on school children's health and hygiene practices in different low- and middle-income countries have been performed. Study design, duration of the intervention and the used educational tools vary from study to study as do the outcome measures.

Bieri et al. (2013) invented a health-educational package, including a cartoon video called 'The Magic Glasses', for primary school children in the Hunan Province of China and tested the effectiveness of this educational package combined with anthelmintic drug treatment (albendazole – 400mg single oral dose). After one school year the study found a 50% efficacy in preventing infections with STHs and was associated with an increased knowledge about STHs and improved hygiene practices.

A similar intervention was carried out in Ivory Coast. '*Koko et les lunettes magiques*' is an educational animated cartoon video with the aim of preventing soil-transmitted helminth infections and diarrheal diseases through improved hygiene knowledge. After screening the cartoon video, the knowledge of school children about STH and good hygiene practices increased immediately. The educational video helps raising awareness and improving hygiene behaviour for school-aged children and might improve sustainability of control and elimination efforts in addition to deworming medication against soil-transmitted helminth infections (Essé et al., 2017).

In Crete, a school health education program (Grade 1 to 6) including dietary questions, physical activity, alcohol, smoking prevention and generally health promotion was assessed for long-term effectiveness. Ten years after its initiation, the intervention group showed a lower increase in BMI and was physically more active than the control group. Furthermore, the incidence of smoking was significantly lower and the difference in the total cholesterol was significantly greater in the intervention group. The education program might have had an impact in terms of improving children's health and decreased risk factors for chronic diseases (Hatzis, Papandreou, & Kafatos, 2010).

A study of the impact of a health education learning package on the incidence and intensity of parasitic worm infections among school children took place in Pahang, Malaysia. After deworming, the learners received health education including topic-related posters, comic book, puppet show, music video, drawing activities and an aid kit. The results showed significant

improvements in the incidence of hookworm infections and the intensity of STH infections. Furthermore, the school children improved their knowledge and hygiene behaviour (Al-Delaimy et al., 2014).

In a systematic review (Watson et al., 2017) of hygiene promotion targeting children, outcomes for handwashing promotion were sparse. Several studies have shown significant effects, but may have been influenced by bias while one study with low risk of bias has showed no significant effects. Furthermore, publication bias may affect the reported results. According to Watson et al. (2017), good-quality evidence is lacking to prioritise hygiene promotion.

Nevertheless, the findings appear to show that health and hygiene education can have a positive impact on school children's infection status and risk factors for chronic diseases and therefore most likely also their health. School-based health and hygiene education might be an efficient way to reach children through the school system and increase their knowledge about health-related topics and hygiene behaviour.

3.4 Health and hygiene education in primary schools in Port Elizabeth

In South African primary schools, health and hygiene education is included in the South African Curriculum and Assessment Policy Statement (CAPS) written by the Department of Basic Education (2011a; 2011b; 2011c). In Foundation Phase (Grade 1 to 3) and Intermediate Phase (4 to 6) it is part of *Life Skills*, while in Senior Phase (Grade 7 to 9) it is called *Life Orientation*. *Life Skills/Orientation* aims to have an impact on the growth process of children in many aspects: Strengthening their physical, personal, social, emotional and cognitive development, increasing their knowledge of personal health and safety, awareness of social relationships and the understanding of the relationship between people and the environment. It should guide and prepare the school children for their lives and its possibilities in the society and their environment. It is an interdisciplinary subject which strengthens and supports the learners. There are 4 main study areas: *Beginning Knowledge* (only in Foundation Phase), *Personal and Social Well-being*, *Creative Arts* and *Physical Education.*

The topic *Personal and Social Well-being* (Department of Basic Education, 2011a, 2011b, 2011c) is the study of the self in relation to the society and the environment and includes social health, emotional health, relationships between individuals and between people and their environment. It aims to enable school children to make morally correct decisions, learn about the values and attitudes in their society, respect rights of others and show tolerance for cultural and religious diversity. Furthermore, they learn how to look after themselves, how to stay healthy and how to deal positively with challenging situations. The main topics contain issues related to nutrition, diseases, safety and violence, substance abuse and environmental health.

4. Project Task

4.1 *KaziKidz* - 'the *KaziBantu* children's toolkit'

The main goal of this project is the development of a toolkit for Grade 1 to 7 school children (children's age 5-12) in disadvantaged neighbourhoods of Port Elizabeth, South Africa. This toolkit focuses on three different main topics: *Physical Education, Moving-to-Music* and *Nutrition, Health and Hygiene Education*. While the Nutrition Education is devised by local students in South Africa to harness existing knowledge of local dietary habits, the other parts of the toolkit are developed by Swiss master students. Each of the three parts is an independent teaching aid, all together make up the *KaziKidz* toolkit. This toolkit aims to increase the knowledge about the importance of a healthy lifestyle for school children.

4.2 Project task – *Health and Hygiene Education*

This master thesis describes and explains the background, development process and structure of the toolkit topic: *Health and Hygiene Education.* The focus of this task was the development of primary school lessons in *Life Skills* and *Life Orientation*. 21 Lessons were planned for *Health and Hygiene Education*, in which the most relevant topics of health promotion and hygiene awareness are taught and discussed in class. In lower grades the issues are introduced while in higher grades health, social and environmental responsibility are emphasized.

4.3 Overall aim – master's thesis

The aim motivating the task of developing a toolkit for *Health and Hygiene Education* has been defined as follows:

"Hygiene, health and sanitation awareness as part of developing and validating a physical education toolkit: contributing to personal and social well-being of children from Port Elizabeth, South Africa"

5. Methods

This chapter provides an overview over the sources and procedure to develop the toolkit structure and content.

5.1 *Health and Hygiene* toolkit

The *Health and Hygiene Education* section and the *Nutrition* education part form together the *Nutrition, Health and Hygiene Education* toolkit. It has been developed for use in primary schools in South Africa from grade 1 to 7. This toolkit contains the most essential topics about nutrition, dietary habits, food hygiene, personal health, hygiene behaviour and environmental responsibility, and is fully aligned with the relevant national curriculum. A more detailed description is given in the following sections.

5.1.1 Structure

The *Nutrition, Health and Hygiene Education* toolkit proposes 6 lessons each year, divided into 2 x 3 lessons per year: 3 lessons on nutrition and 3 lessons on health and hygiene. Together, from Grade 1 to 7 this means 21 lessons for each subject area or a total of 42 lessons. The duration of the lessons has been fixed to 40 minutes per lesson but they can easily be extended to fit local schedules. Similarly, the *Health and Hygiene Education* lessons are designed as normal lessons but they can also be presented in longer information sessions like health days.

Special attention has been given to ensure that the lessons are easy to handle and there won't be an extra effort for the teacher to hold the lessons. Furthermore, the lessons are meant to be joyful and memorable for the children, and effective. To ensure this, different methods were used, which were adjusted from grade to grade. The following table offers a list of different tools which are used in the *Health and Hygiene Education* toolkit.

Table 1

Tools for the Health and Hygiene Education

▪ Games ▪ Cartoons/comics ▪ Role-plays ▪ Memory/Matching ▪ Drawings ▪ Brainteasers	▪ Posters ▪ Songs ▪ Environmental walks ▪ Group discussions ▪ Make your own leaflets ▪ Activities	▪ Demonstrations ▪ Story writings ▪ Create your own posters/ instructions ▪ Projects

As written in the CAPS (Department of Basic Education, 2011a), it is crucial for school children that they are not stuck in chairs behind desks all day long. Free play activities, a well-managed, child-friendly and freely accessible environment, and also a range of routine and structured activities are encouraged. These factors should ensure that learners are involve better in health

education and will be able to master and understand the key issues related to personal hygiene and good health. As a result of this, the lessons were planned to be diverse with activities like drawing, writing, singing, designing, playing inside and outside, group discussions etc. This variety should make the lessons more interesting and enjoyable. Furthermore, there are different types of work like individual work or work in pairs to encourage the school children to work independently, work in groups or with the whole class. Simultaneously, the lessons need to be instructive and informational, to increase concentration, knowledge, and skills. To support this process, it is essential that the lessons are simple and easy to understand for teachers and especially for school children. Due to the circumstances that prevail in these disadvantaged neighbourhoods the teacher have to deal with little material teaching aids. Thus, the lessons are planned with as few equipment as possible, adapted to encourage children in disadvantaged areas to adopt a healthy lifestyle and to support them in their development process in essential life skills as a preparation for the adolescence.

5.1.2 Content and topics

The *Health and Hygiene Education* will be allocated under the subject *Life Skills* and subordinated to *Personal and Social Well-Being*. The subject *Personal and Social Well-being* contains three main topics: *Development of the self, health and environmental responsibility* and s*ocial responsibility*. Since the aim is *Health and Hygiene Education*, the toolkit best fits in *health and environmental responsibility*.

In order to be sure that the toolkit will be applied, it needed to be ensured that it is closely following the requirements of the South African Curriculum and Assessment Policy Statement (Department of Basic Education, 2011a, 2011b, 2011c) and especially the suggested topics in *health and environmental responsibility*. After careful consideration and deliberation, nine topics have been chosen initially. During the field stay and pilot testing in South Africa, additional topics have been added based on the local situation. Finally, the following topics (Table 2) have been chosen for the different grades.

Table 2

Topics in Health and Hygiene Education

Grade	Topic	Focus and aims
1	Hand washing I	- Importance of hand washing for preventing germs - Hand washing demonstration
1	Proper use of toilet I	- Good and bad toilet habits - Different toilets around the world
1	Body hygiene	- How to keep yourself clean and healthy
2	Clean water and food	- Safe and unsafe water - Rules for good eating - Food poisoning - Build your own water filter
2	Healthy lifestyle – Good habits	- Healthy lifestyle habits
2	Preventing colds and flu	- Increase knowledge about colds and flu - What to do to feel better - Behaviour when you are sick
3	Importance of keeping the environment clean and safe I	- Increase knowledge about environmental facts - How to keep the environment clean and safe - Waste disposal
3	Importance of water – in our environment	- Different uses of water - States of water - The water cycle
3	Tooth brushing	- Increase knowledge about teeth and gums - How to take care of them - How to brush teeth properly
4	Hand washing II	- Short repetition - Germ spreading experiment - Increase knowledge about germs
4	Proper use of toilet II – being a faecal detective	- Short repetition - Assess the condition of school toilets - What is a proper toilet
4	Germs	- Repetition, F-Diagram – infection routes, facts about germs

5	Substance abuse I	- Substance abuse and addiction - Types of drugs - Negative effects of smoking and drinking
5	Importance of water and nutrition – the human body	- Why the body needs water and nutrition - Safe water to drink - Water balance in the human body
5	Importance of keeping the environment clean and safe II – environmental walk	- How to protect the environment and keep it clean and safe - Sensitisation for a clean environment
6	Basic first aid	- Increase knowledge about basic first aid and practical training
6	Food hygiene	- Food contamination - Prevention including storage and preparation
6	Physical activity	- Health benefits of physical activity - Practical training
7	Health and hygiene	- Writing an essay to improve self-written skills and to deal intensively with the topic
7	Substance abuse II	- Difference between physical and mental addiction - Different substances and drugs - Prevention
7	Healthy lifestyle	- Making a self-made project - Increasing children's independence for a healthy lifestyle

As stated in the Curriculum and Assessment Policy Statement (Department of Basic Education, 2011a, 2011b, 2011c) the *Foundation Phase* ranges from Grade 1-3, Grade 4-6 are *Intermediate Phase* and Grade 7 belongs to *Senior Phase*. These topics are mostly closely related to the CAPS (Department of Basic Education, 2011a, 2011b, 2011c), but with a different and new approach in the teaching style. Interactive teaching including brainstorming, think-pair-share, educational activities and independent thinking and implementation of own projects are examples of this new approach. In some topics, there are short repetitions, based on what the school children have already learned in the previous years, followed by the new educational objectives. In Grade 7, among other things, what they have learned from Grade 1-6 is revisited in the form of a written essay and a self-made project to raise awareness for a healthier lifestyle. The developed lessons includes the lesson plans, the corresponding worksheets, informative and guiding posters and assessments to test what the children have learnt.

These lessons in the Health and Hygiene Toolkit are intended to teach new skills and also serve as an addition and repetition to already existing topics in *Personal and Social Well-being* subjects.

5.1.3 Sources

To develop the Health and Hygiene Education lessons, the textbooks on *Life Skills* for South African primary schools from various publishers were consulted and compared to ensure the topics fit into the CAPS (Department of Basic Education, 2011a, 2011b, 2011c). Further, the CHAST manual was consulted to get additional ideas and inspirations on how the lessons could be designed to make them as attractive as possible for teachers and their classes. In the following section, the particular sources are described.

CAPS – Curriculum and Assessment Policy Statement

The Curriculum and Assessment Policy Statement is the national curriculum, written and published by the Department of Basic Education of the Republic of South Africa (2011a; 2011b; 2011c). The curriculum is a comprehensive policy document, which gives expression to knowledge and skills for South African schools and aims to ensure that school children acquire and apply these knowledge and skills. The CAPS specify the guidelines according to which the teachers have to teach the children.

CHAST – Children's Hygiene and Sanitation Training

The CHAST manual (Lowe, 2012) was developed and published by Caritas Switzerland. Nowadays, it is a general guide that can be used anywhere in the world in order to support hygiene and sanitation training for children. The objective is to promote good hygiene behaviour among children using a variety of exercises and educational games to raise awareness about personal hygiene connected to good health. The manual contains and utilizes a wide variety of tools to encourage children to increase their hygiene skills.

South African Educational Textbooks

In order to obtain a broad overview, various educational textbooks were consulted. The publisher included *Macmillan, Maskew Miller Longman, Oxford, Platinum, Spot On, Vivlia* and *textbooks of the Department of Basic Education*. They were used to identify specific issues which should be considered concerning styles of teaching, assignments of tasks and needed material.

5.2 Procedural method

5.2.1 Intensive four-week *KaziBantu* workshop in Basel, Switzerland

In August 2017, four students from the Department of Human Movement Science of the Nelson Mandela University of Port Elizabeth in South Africa were invited to Basel, Switzerland, for a four-week workshop and intercultural exchange. Hosted by the Department for Sports, Exercise and Health Science of the University of Basel, the South African students, the Swiss students and the local *KaziBantu* team worked together on the design of the project. It started with a comprehensive literature research, followed by a first gathering of ideas for realization. In-depth discussions and a steady exchange of ideas and options took place throughout this four-week workshop. This process was indispensable for the preparation of the next steps. The knowledge of the South African colleagues about local conditions and situations in schools simplified the work and illustrated what was to be expected.

5.2.2 Field stay and pilot testing in Port Elizabeth, South Africa

A few weeks later, the next phase of the project took place in Port Elizabeth at the Department of Human Movement Science. The field stay was characterized by developing the toolkit and a pilot testing of some selected lessons at two different primary schools in the Nelson Mandela Bay Metropolitan Municipality, Eastern Cape Province. The Enkwenkwezini Public Primary School in the township areas in Motherwell and the Sapphire Road Primary School in the northern areas in Bethelsdorp were selected for the pilot testing. Motherwell's inhabitants are predominantly black Africans, while in Bethelsdorp the majority of the population are coloured. Our team was always very welcome, although the teachers and children were preparing for examinations. Due to this fact, only a few lessons could be tested. In both schools, a lesson with a focus on hand washing has been tested on Grade 1 learners. In addition, a lesson on the importance of keeping the environment clean and safe including an environmental walk was successfully tested on a Grade 5 class. This testing provided an informative validation of the lessons regarding to the handling and realization by the teachers, and allowed to make necessary modifications. Local expert feedback, observations and interviews were the most important tools to identify potential difficulties and possible approaches.

5.2.3 Revision phase

Back in Switzerland, the toolkit was completed. Multiple revision were carried out and the assessments, belonging to the lessons, were written and designed. Furthermore, all the designs and drawings for the lessons were progressed. *Rooftop*, a multimedia company located in Port Elizabeth, was hired for this task. To ensure that everything will be as planned, an illustration check and adaptations needed to be made for all drawings, designs, posters, worksheets and assessments.

6. Results

The focus of this thesis was the development of the *Health and Hygiene Education* section of the *Nutrition, Health and Hygiene Education* toolkit. For this reason, no results are available at the time of writing about the final acceptance by teachers and students, and the efficacy and impact of the toolkit.

6.1 Product description

6.1.1 Content and corresponding material

The lessons always follow the same pattern and format. Introduction, main part and 'wrap up' divide the lessons in its different timeframes. Needed materials and learning targets are described on top of each lesson sheet. Explanations and topic-related drawings guide teachers through the lesson and support them with suggested teaching patterns. Each lesson sheet is coloured in the matching colour of the particular toolkit.

Topic-related worksheets are coloured in black and white, and are designed to be copied and handed out to the learners. The worksheets differ in subjects and tasks include drawing, writing, discussing, matching etc. and support a long-term and better understanding of the topic under discussion. Posters, already designed and printed, or self-made poster by the learners, will help as guidance or reminders on various topics such as hand washing, tooth brushing or prevention of colds and flu.

Ready-to-use assessments contain different tasks which summarize the topics discussed in each grade, one assessment per grade. The attached assessments can be integrated into formal assessments or with a larger range of subject matters. The assessments include codes and percentages for recording and reporting, adjusted to the CAPS (Department of Basic Education, 2011a, 2011b, 2011c). It can be easily used as a formal assessment and teachers are able to record the marks for the learners' report cards.

The corresponding material is available and attached to each lesson. A sample lesson with its additional material of the *Health and Hygiene Education* from the *Nutrition, Health and Hygiene Education* toolkit is attached as an appendix (p. 34-37).

6.1.2 Usability

The main focus during the development process of the toolkit was on simplicity, clarity and feasibility. These factors are the most essential to ensure and increase the likelihood that the toolkit will be applied by the teachers. After intensive considerations, discussions and in agreement with the teacher's opinions, the toolkit will be distributed to schools in the form of folders. One folder will be provided per grade, with each lesson arranged with the corresponding material. Each lesson description is printed front and back on a single A4 format paper and laminated for repeated use. The original material, including worksheet and assessment templates, should be returned to the folders after it has been used. They serve as

templates for copies which are handed out to learners. In case the material is used up, it is also available on the internet (*www.http://kazibantu.org/*).

6.1.3 Corporate identity

Appearance and design are decisive for the future implementation of the toolkit. The school grades have been assigned different colours, and each toolkit has its own matching colour spectrum. A shade of green was chosen for the *Nutrition, Health and Hygiene* toolkit. In addition, each toolkit has got its own icon (Figure 4). The heart as part of an apple was considered to accurately represent the idea of the *Nutrition, Health and Hygiene* toolkit, representing a healthier and more active lifestyle. Red is the colour of the *Moving-to-Music* toolkit and is represented by the icon of a bush drum. *Physical Education* is identified by a running stick figure and the colour blue. The colour differences and icons serve to clearly identify the particular toolkits.

Figure 4. Icon of the *Nutrition, Health and Hygiene* toolkit.

As a motivator and companion acts the *KaziBantu* mascot called *'Kazi'* (Figure 5). The friendly and clever lion will help the school children, especially the younger generations. It is a role model and provides important messages and some tips and tricks to improve essential life skills. The lion have been chosen as it is one of the 'Big Five' animals from South Africa and represents power and wisdom. In the *Nutrition, Health and Hygiene* toolkit *'Kazi'* is wearing a school dress, while in the other two toolkits he is wearing sport clothes in the particular colour. Kazi always wears the relevant icon on the shirt.

Figure 5. Mascot '*Kazi'* in the *Nutrition, Health and Hygiene* clothes.

The design including colour scheme, layout and Mascot development have been led by the multimedia company Rooftop, in close collaboration with the developers of the toolkit structure and content.

7. Discussion

The following chapter describes first the barriers and limitations and then the strengths and possibilities of the *KaziBantu* project with its *KaziKidz* educational program. Additionally, the next steps of the project are discussed.

7.1 Project limitations and strengths

7.1.1 Barriers and limitations

Several barriers have to be overcome to successfully implement the lectures. On one side are institutional barriers and on the other side are environmental and situational barriers. It will depend on many different factors whether the lessons are finally taught in class or not.

Like it is described in chapter ***2.3.2. Situation in disadvantaged primary schools in Port Elizabeth, Eastern Cape***, the conditions in underprivileged areas can be harsh. The lack of equipment and material is observed throughout the schools. At the aforementioned school, not a single waste bin was available on the entire school ground. After every break, the ground was littered with waste. Insufficient and inadequate infrastructure is one of the major barriers, especially with regard to the school children's health and their hygiene behaviour. The sanitary facilities are of great importance. Unfortunately, the facilities in many schools are in bad and dirty condition, with damaged flushing mechanisms, taps, walls and doors, leaking urinals with soaked floors and no toilet paper nor soap. Thus, some improvements in sanitary facilities are required to provide a healthy environment to the students.

Life Skills/Orientation lessons are marginalized because priority is placed on other subjects. According to a Grade 1 teacher (M. Matshana-Mhlabeni, personal communication, November 1, 2017), Life Skills/Orientation is more often omitted than other subjects: *"We are cheating Life Skills. We are always focusing on the children to write and read."* A further problematic issue the teachers are confronted with is that kids with special needs cannot visit an appropriate school. A large number of special needs learners attend regular public schools, increasing pressure on teachers, especially considering the large class sizes.

Thus, the success of the *Health and Hygiene Education* might strongly depend on the conditions in the particular school. As long as there is a lack of sanitation, it will hinder good hygiene behaviour. The learned knowledge of good hygiene behaviour and environmental responsibility without adequate access to clean water and sanitation facilities can practically not be implemented. What the children have learned will be difficult to put into practice. A further challenge could be the linguistic diversity, especially in the township areas where the majority is black and isiXhosa the first spoken language. Particularly for the Foundation Phase learners this can lead to complications. As a teacher mentioned, the textbooks are structured in English and therefore for Foundation Phase learners occasionally too challenging. The *KaziKidz* toolkit appears first in English and will later probably be translated into the local languages.

The living conditions also an influence on the learner's capabilities and potential. Undernutrition, overcrowding, poor sanitation, poverty, high unemployment, widespread

substance abuse and criminality do not provide a supportive environment to grow up and can hinder children from realizing their full potential. This circumstances impede and complicate the learner's learning process in life skills in an essential way.

7.1.2 Strengths and possibilities

The results of the longitudinal cohort study *DASH* (Müller et al., 2016) showed that 26% of the tested school children were infected with *Ascaris lumbricoides* and 22% with *Trichuris trichiura*. The data should galvanize the primary school teachers and might hopefully sensitise the learners for the importance of health and hygiene behaviour. The results from the DASH study (Gall et al., 2017; Müller et al., 2016; Yap et al., 2015) show that there is need for a specific interventions and the *KaziBantu* project with its *KaziKidz* education toolkit could have a positive impact when correctly implemented and taught in class. Sustainability of implementation is decisive for the outcome of the project, to have a positive impact on the school children's health, selective attention and academic performance. The *KaziKidz* education toolkit comprehensively covers the major topics in *Life Skills* including physical fitness and nutrition, health and hygiene awareness and tries to help the children to increase their capabilities. Moreover, the lessons should encourage the children to share their experiences and knowledge with their families, community and peers.

The project is supported by local experts and follows the official curriculum. Also, the entire project has been designed and implemented in close collaboration with the health and education departments, increasing the chances of a sustained implementation.

7.2 Next steps

The next steps include the distribution and implementation of the *KaziKidz* education toolkit in a few selected schools in impoverished areas in Port Elizabeth, South Africa, for the possibility to evaluate the influence of the *KaziKidz* lessons on school children's health. After the implementation, the acceptance and impact evaluation will begin to obtain meaningful statements and conclusions. Multiple parameters can be measured, as it has already been done in the DASH study.

To evaluate and prove if the *Nutrition, Health and Hygiene Education* toolkit has a positive impact on school children's health, an open label randomized-controlled trial study design could be chosen. If the evaluation of the *KaziKidz* toolkit impact indicates a positive and verifiable influence on the school children's health, it should in a next step be scaled-up to other areas, cities, provinces, and maybe countries.

Besides that, the *KaziKidz* toolkit aims to support teachers in underprivileged areas in their professional development, particularly teaching skills.

8. Conclusions and outlook

8.1 Conclusions

Health education and sanitation interventions offer opportunities to improve the health of school children and their hygiene behaviour. Using readily available information and with an emphasize on relevance in the local context, we have developed a Health and Hygiene section for the *Nutrition, Health and Hygiene Education* toolkit for use in underprivileged schools across Port Elizabeth, South Africa. In the face of competing priorities, insufficient sanitary facilities and ignorance, is indispensable that learners, teachers and the school management pursue the same objective and support each other to achieve the goals. Only such joint endeavours will succeed in fulfilling the aim of improving the school children's health and well-being, and promoting them to reach their socio-economic potential. Schools play an important role not only in education, but also in promoting and supporting good habits and practices, and locally adapted teaching materials that are considered relevant and responsive to local needs are generally welcomed.

To ensure the long-term implementation of the toolkit, it follows the requirements of the South African Curriculum and Assessment Policy Statement. Nevertheless, the implementation is a great challenge and the impact of the toolkit on school children's health has yet to be determined. Such rigorous adaptation to local context, close collaboration with relevant authorities and the beneficiaries, and careful impact evaluation will need to be repeated should the toolkit be used in other socio-cultural settings.

8.2 Outlook

If the positive impact of the *KaziKidz* Toolkit on school children's health is proven, a scale-up to more primary schools will be a next step. For this reason, it is relevant that the lessons are adaptable for each new setting with its different conditions. Rural areas may face other challenges than township areas and vice versa. Living conditions and lack of sanitary facilities will probably make the biggest difference. Possible topics would be 'how to build a hand washing station' or 'how to build a latrine' depending on the prevailing conditions. This adaptation will be even more important if the toolkit is to be used in other countries.

As the Deputy of the Enkwenkwezini Public Primary School mentioned (T. P. Mali, personal communication, November 3, 2017) there will one day be laptops for each teacher: "We have to use the technical era." Therefore, the *KaziKidz* Education Toolkit with all the lessons, worksheets, posters and assessments will also be made available on the internet (*www.http://kazibantu.org/*).

The *KaziBantu* project tries to pave the way for a new generation of healthy children and aims to reach as many school children as possible to influence their lives in a positive way. The toolkit will be accredited by the Nelson Mandela University and offered to teachers as part of their continued professional development. The first draft will be presented in the middle of 2018.

To end this thesis, I would like to quote a man who took responsibility to change the future of a whole nation and tried to make a difference in minds and actions of many people in a time when it was strongly needed:

"As long as poverty, injustice and gross inequality persist in our world, none of us can truly rest."

- Nelson Mandela

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10. Appendix

10.1 Example lesson – Handwashing Grade 1

Grade 1 | Lesson 1 | Time: 40 min

Handwashing (I)

Health-and-hygiene: Foundation phase

Materials

- Handwashing poster ('Let us wash our hands!')
- Sink, soap and paper towels.
- 'When to wash your hands' worksheet.

Aim

- Understanding WHY it is important to wash our hands.
- Knowing WHEN we need to wash our hands.
- Learning HOW to wash our hands properly.

Introduction

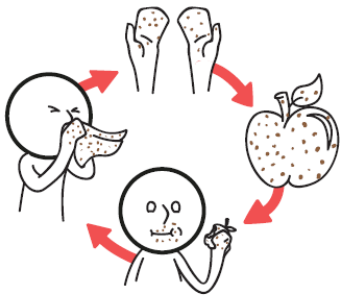
Introduction
Time: ~ 5 min

Welcome the learners and introduce them to the daily topic.

Group discussion

Ask the learners WHY it is important to wash their hands.
Possible answers:

- Hands are 'germ spreaders'.
  - Hands can spread germs from faeces to food or water and these can be passed on to other people. These people can get infected by the germs and become ill.



Ask the learners HOW we can stop germs from spreading.
Possible answers:

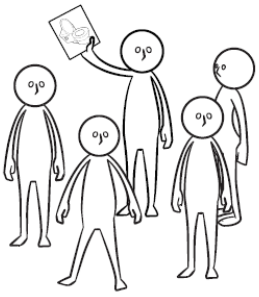
- Better hygiene.
- Going to school and learning about how to look after our health.
- Washing our hands.

'Who is the fastest' competition

Main part
Time: ~ 10 min

How to play

- Divide the class into 5 or 6 groups.
- Give each group a set of the larger pictures from the 'When to wash your hands' worksheet. (The 7 pictures in the set of large pictures should be loose).
- Read out one of the answers from the list (in bold) below. The groups need to find the large picture that matches with the answer you have read.
- Once they have found the correct picture they hold it in the air.
- For every correct answer the group gets one point. The group that holds up the correct answer first gets 2 points. (Keep a record of each groups points on the board.)
- The group with the most points at the end wins the activity
- After they have chosen the correct picture, place a copy of it on the wall and repeat what is written underneath it.



ANSWERS: After using the toilet; after sneezing or coughing; after playing with pets; after sports or playing outside; after being with someone who is sick; before eating; before cooking.

Page 1 of 2

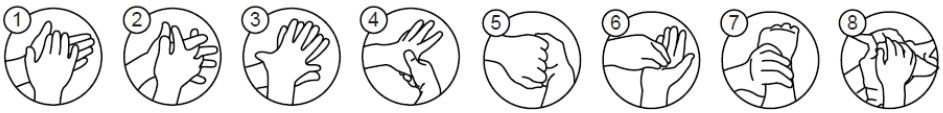
How to wash your hands properly

Main part
Time: ~ 10 min

Demonstration

Use the 'Let us wash our hands!' poster and go through the 8 steps that are shown.
Explanation:

- Ask each learner to put their hands out in front of themselves (allow them to copy you as you show them) and then read through the steps on the poster. Get them to practice the different rubbing motions as you go along. Try to repeat each step so that all the learners can follow.
- Finally use the picture at the bottom of the poster to remind the learners to wash the areas that are coloured in red when they wash their hands. Allow the learners to copy you as you show them these areas on your own hand.



Now demonstrate correct hand-washing at any open sink (the school bathroom or kitchen).

- Use soap and paper towels.
- After showing the learners how you wash your hands allow them to try washing their hands according to the steps. Move around to each learner to make sure they know how to wash their hands correctly.
- Make sure each learner gets a chance to wash their hands.

"The handwashing song"

Main part
Time: ~ 5 min

Ask the learners to sing 'The handwashing song' along with you. Tell them that it will remind them of the correct way to wash their hands. Repeat the song a few times.

Lyrics

"This is the way we wash our hands,
wash our hands, wash our hands.
This is the way we wash our hands,
wash them every day.
Palm and back and in between,
in between, in between.
Palm and back and in between,
wash the dirt away."

Worksheet and colouring-in activity

Main part
Time: ~ 5 min

Hand out a copy of the 'When to wash your hands' worksheet to each learner. Repeat the situations WHEN the learners should wash their hands. Allow them time to colour in the drawings.

Summary

Cool down
Time: ~ 5 min

Ask the learners what they remember learning in the lesson. Encourage them to ask questions about what they have learnt in this module. Repeat the aims of the lesson by asking the learners:

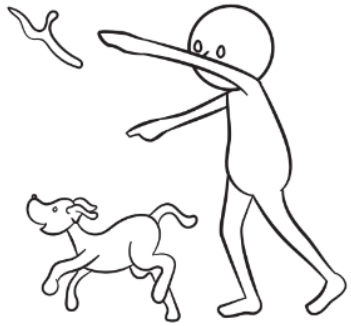
- WHY
- WHEN
- HOW

Encourage the learners to share what they have learnt with their parents and friends in the community.
(Speak to the school principal about how the school can make sure that there is always soap in the school bathrooms for the learners.)

Notes: The 'Let us wash our hands!' poster can be stuck on the classroom wall as a reminder of the lesson.

Handwashing worksheet

Name: _____ Date: _____ Class: _____

WHEN to wash your hands	 AFTER using the toilet	 AFTER sneezing or coughing	 AFTER being with someone who is sick
 AFTER playing with pets	 AFTER sports or playing outside	 BEFORE eating	 BEFORE cooking

KAZIBANTU
Healthy Schools for Healthy Communities

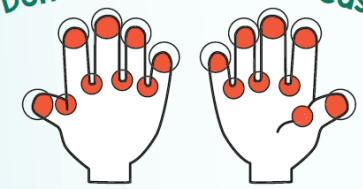
LET'S WASH OUR HANDS!

How to wash your hands

Wet your hands with water and use enough soap to cover the hands.
Rub soap over hands as shown:

When to wash your hands

Don't miss the red areas!



CLEAN HANDS KEEP YOU HEALTHY AND STRONG!

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